

Name: _____




Date: _____

Exam: Function Reflections (Solution version 30)

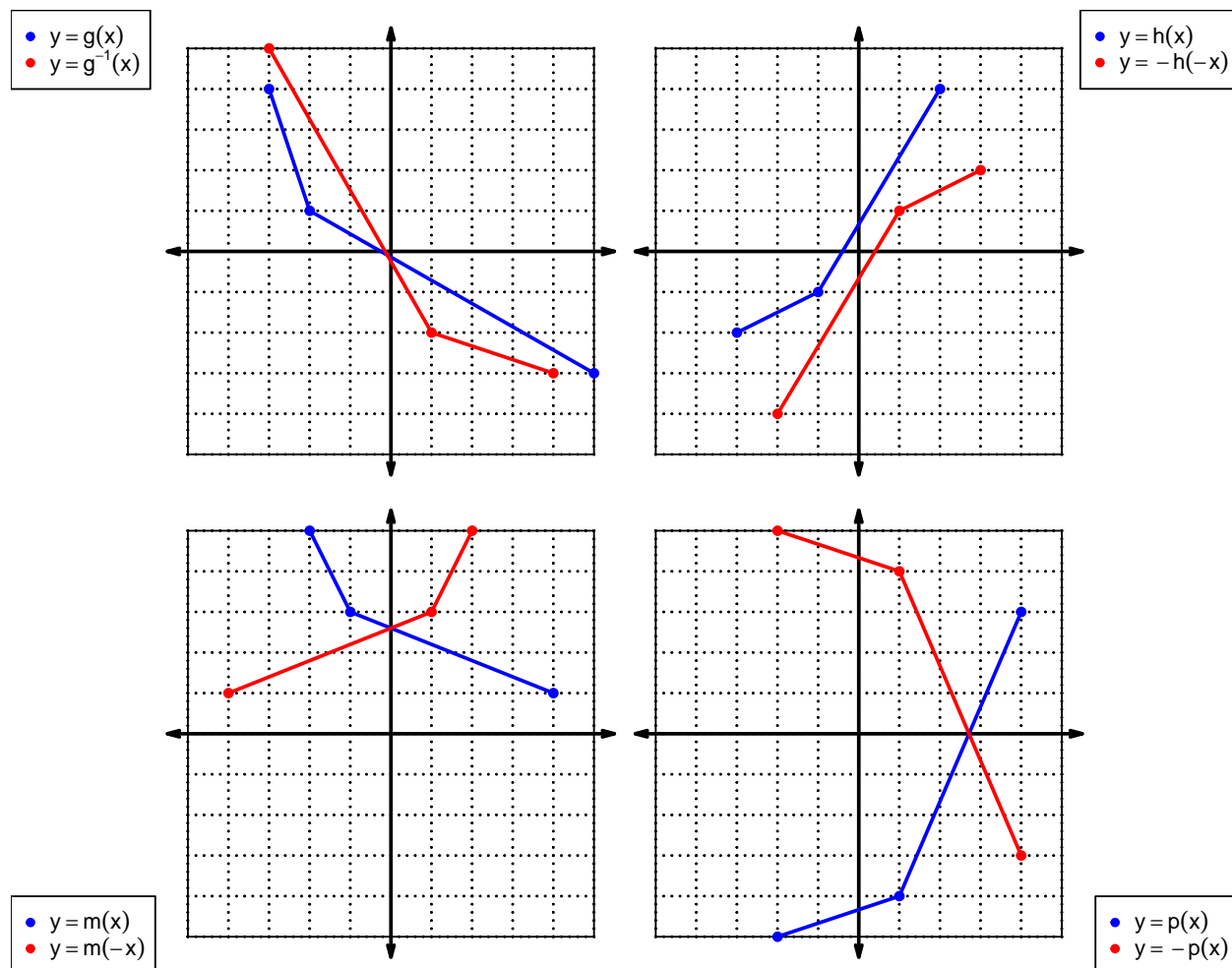
1. Let function f be defined by the polynomial below:

$$f(x) = -6x^5 + 3x^4 - 7x^3 + 9x^2 - 5x + 8$$

Draw lines that match each function reflection with its polynomial:

Reflections		Polynomials
$f(-x)$		$6x^5 - 3x^4 + 7x^3 - 9x^2 + 5x - 8$
$-f(-x)$		$6x^5 + 3x^4 + 7x^3 + 9x^2 + 5x + 8$
$-f(x)$		$-6x^5 - 3x^4 - 7x^3 - 9x^2 - 5x - 8$

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 30)

For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	5	2	9
2	3	9	8
3	1	4	7
4	9	7	1
5	6	8	2
6	7	3	4
7	8	1	6
8	4	6	5
9	2	5	3

3. Evaluate $f(9)$.

$$f(9) = 2$$

4. Evaluate $h^{-1}(6)$.

$$h^{-1}(6) = 7$$

5. Assuming g is an **odd** function, evaluate $g(-3)$.

If function g is odd, then

$$g(-3) = -4$$

6. Assuming f is an **even** function, evaluate $f(-8)$.

If function f is even, then

$$f(-8) = 4$$

Exam: Function Reflections (Solution version 30)

7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = -x^2 - x$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 - (-x)$$

$$p(-x) = -x^2 + x$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(-x^2 + x)$$

$$-p(-x) = x^2 - x$$

- c. Is polynomial p even, odd, or neither?

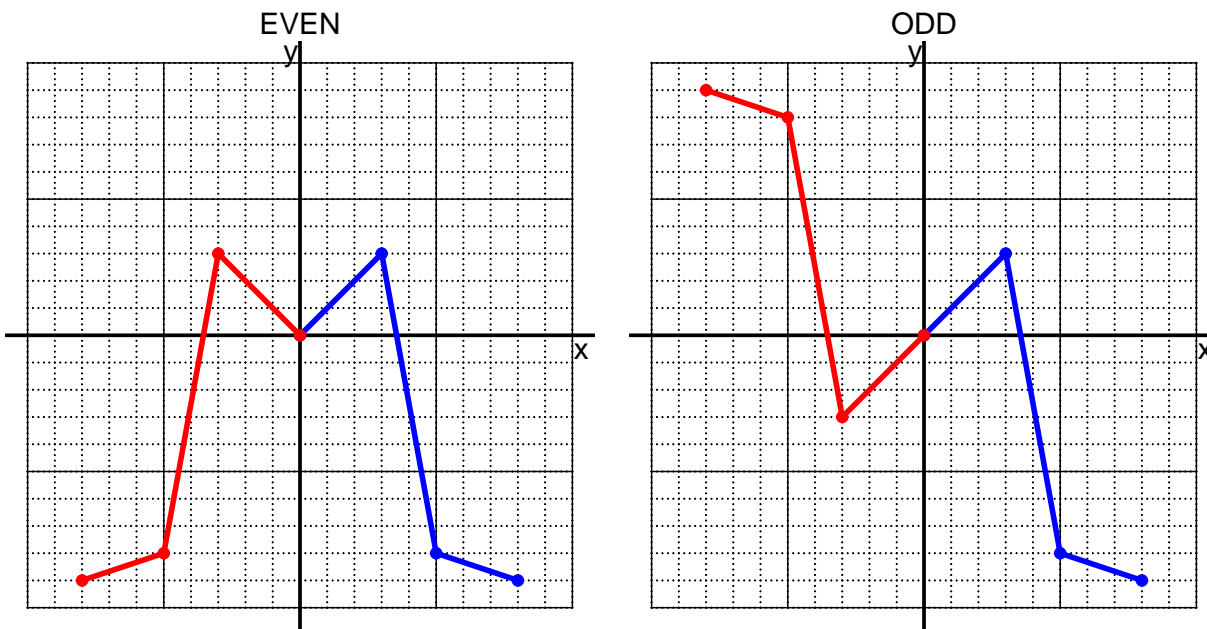
neither

- d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

Exam: Function Reflections (Solution version 30)

8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 8x - 5$$

- a. Evaluate $f(10)$.

step 1: multiply by 8
step 2: subtract 5

$$f(10) = 8(10) - 5$$

$$f(10) = 75$$

- b. Evaluate $f^{-1}(99)$.

step 1: add 5
step 2: divide by 8

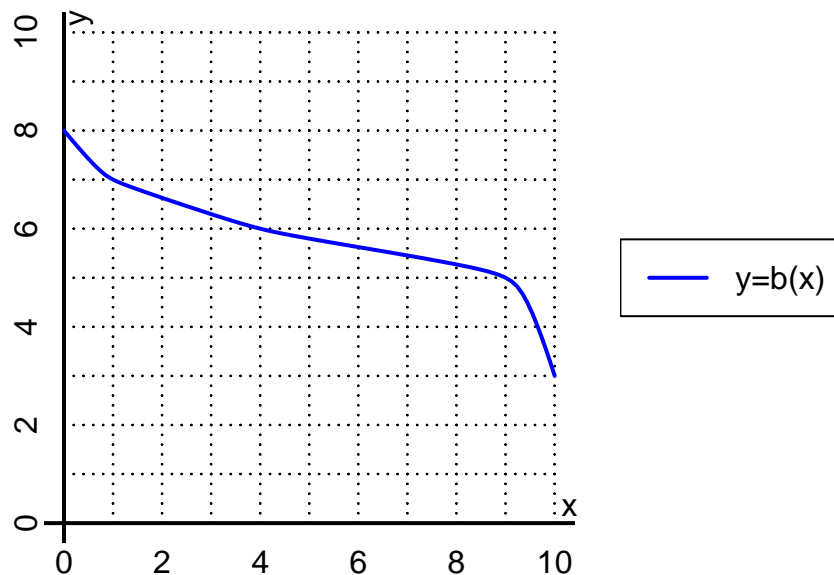
$$f^{-1}(x) = \frac{x + 5}{8}$$

$$f^{-1}(99) = \frac{(99) + 5}{8}$$

$$f^{-1}(99) = 13$$

Exam: Function Reflections (Solution version 30)

10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(4)$.

$$b(4) = 6$$

b. Evaluate $b^{-1}(7)$.

$$b^{-1}(7) = 1$$

Exam: Function Reflections (Solution version 30)

11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-8	8	8	-8
-1	9	-9	-9	9
0	0	0	0	0
1	-9	9	9	-9
2	8	-8	-8	8

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.